REMARKS

The Specification was objected to because the Title was not descriptive.

The Title has been amended in this Reply. Accordingly, withdrawal of this objection is respectfully requested.

Rejection under 35 U.S.C. § 102

Claims 1, 6 and 7 were rejected under 35 U.S.C. § 102(e) as being anticipated by Freedman et al. (6,765,380 B2). This rejection is respectfully traversed.

The present invention discloses methods for formation evaluation based on multi-dimensional representations of nuclear magnetic resonance data. A method of the invention, as recited in claim 1, includes the following limitations: "obtaining a set of NMR data for a fluid sample; computing from the set of NMR data *a multi-dimensional distribution* using a mathematical inversion independent of prior knowledge of fluid sample properties; *displaying the multi-dimensional distribution as an at least two-axis graph*; identifying at least one fluid instance *on the graph* representing a probable existence of a detected fluid; and computing a quantitative formation evaluation value for the at least one fluid instance based on the multi-dimensional distribution associated with the at least one fluid instance."

The method as recited in claim 1 is a graph-based method. The NMR data are inverted, without prior knowledge of the fluid compositions or properties, to produce a multi-dimensional distribution graph. The multi-dimensional graph is based on *at least two* NMR properties, such as a diffusion constant (D), T_1 relaxation, T_2 relaxation, T_1/T_2 ratio, etc. (*see* FIGs. 3-7). The peaks in such multi-dimensional graphs are then used to compute quantitative formation properties.

In contrast, Freedman discloses methods for determining downhole reservoir wettability. A set of NMR data are obtained while formation fluids are in the formation, and another set of NMR data are obtained after the fluids have been withdrawn into a tool. Spin relaxation times (T_2) are inverted for these two sets of NMR data. The distributions of the T_2 relaxation times are then compared to derive formation wettability. (Abstract).

The methods disclosed in Freedman are based on one-dimensional (T_2) analysis. Figures 7 -10 in Freedman show distributions of different species having different T_2 relaxation times, i.e., distribution as a function of T_2 only (one dimensional distribution). These Figures do not show *multi-dimensional distributions*. Furthermore, it is not a graph-based analysis, i.e., it does not identify a fluid peak *on the graph*.

Specifically, Freedman does not teach or suggest "computing from the set of NMR data *a multi-dimensional distribution* using a mathematical inversion independent of prior knowledge of fluid sample properties; *displaying the multi-dimensional distribution as an at least two-axis graph*; identifying at least one fluid instance *on the graph* representing a probable existence of a detected fluid; and computing a quantitative formation evaluation value for the at least one fluid instance based on the multi-dimensional distribution associated with the at least one fluid instance," as required by claim 1.

For anticipation under 35 U.S.C. § 102, the reference must teach *every* aspect of the claimed invention either explicitly or impliedly. Because Freedman fails to teach the limitations of claim 1, it cannot anticipate claim 1. Claims 6 and 7, which depend from claim 1, should also be patentable for at least the same reasons. Accordingly, withdrawal of this rejection is respectfully requested.

Allowable Subject Matter

Claim 5 has been indicated to be allowable if re-written in independent form including all of the limitations of the base claim and any intervening claims. For reasons stated above, Applicant believes independent claim 1 is allowable. Accordingly, Applicant respectfully defers re-writing claim 5 in independent form at this time.

CONCLUSION

Applicants believe this paper is fully responsive to each and every ground of rejection and objection cited by the Examiner in the Office Action, and respectfully request reconsideration of the application.

Please charge any applicable fees, or apply any excess, to deposit account number 19-0610.

Respectfully submitted,

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